

# EXHIBIT A

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Method For Producing Active And/Or Selective Solid Catalysts  
From Inorganic Or Organometallic Materials

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B1<sup>5</sup>  
The invention relates to a method for a fast and economic development of solid catalysts for heterogeneous catalytic reactions, occurring in processes in the chemical production and in the refinery technology as well as in environmental technology, by their parallel testing according to evolutionary methods.

10 The new development or improvement of heterogeneous inorganic solid catalysts is based on empirical expert knowledge and basic knowledge. Even though a comprehensive basic knowledge is available in regard to the function of individual inorganic components or compounds in the catalysis  
15 of certain partial reaction steps, which is of decisive importance for the catalyst development, it cannot be avoided in practice within the near future to prepare a large number of catalysts which are comprised of different active components or phases and to test them with regard to the  
20 catalytic action for the reaction in consideration.

For carrying out a predetermined reaction, several catalytically active phases will generally be available which are produced in a suitable manner and in a ratio of the active components to be empirically determined and which are  
25 combined in this way. The knowledge of physical, physical-chemical, and catalytic properties of solid bodies forms a rational basis for the selection of catalytically active materials in the catalyst development and improvement. Even when in an ideal situation the correct individual components  
30 or individual phases of the catalyst can be selected, it is required to determine the suitable mass ratio and preparation method.

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35 A suitable method for such optimization problems is the application of combinatorial and evolutionary methods (Ugi, I. et al., Chimia 51 (1997) 39 - 44). These algorithms have been employed in the past in biochemistry and active ingredient research in order to select within a time as short as possible new substances with a desired specific activity from a plurality of compounds. These principles have also been used in

16. A method for preparing active or selective solid catalysts of inorganic or organometallic materials or mixtures thereof by selecting a certain number of solid catalysts of different chemical composition or different weight composition or different chemical and different weight composition and determination of essential catalyst properties, comprising arbitrarily or randomly newly structuring by means of crossing and mutation, selected among the stochastic methods of random-check generators, throwing dice, and/or performing drawings, the individual catalyst components or amounts of mass of the catalyst components or the catalyst components and amounts of mass in the best catalysts of the first generation, in the form of certain chemical compounds, with respect to activity or selectivity or activity and selectivity for a certain catalytic reaction, determining the activity or selectivity or activity and selectivity of the obtained catalysts of the second generation, again arbitrarily or randomly newly structuring by means of the aforementioned stochastic methods the individual catalyst components or amounts of mass of the catalyst components or the catalyst components and amounts of mass of a portion of the best catalysts of the second generation, determining the activity or selectivity or activity and selectivity of the obtained catalysts of the third generation, and continuing these steps of new structuring of the best catalysts of all generations and the property determination up to obtaining one or more catalysts with the desired properties for the specific catalytic reaction.